

According to some accepted wisdom, long-distance markets are already highly competitive. The Connecticut experience establishes otherwise. Residential subscribers in Connecticut gained even more in long-distance markets than in any other. In April 1996, AT&T petitioned the FCC to be able to reduce its long-distance rates in Connecticut alone. AT&T had to do this, the company argued, to respond to "the rapidly emerging competition from SNET in Connecticut."¹⁶⁶ MCI asked for permission to reduce rates charged to Connecticut customers as well, "to address special competitive situations."¹⁶⁷ Perhaps the FCC feared that the success of competition in Connecticut would expose the failure of federal regulatory policy elsewhere. In any event, the Commission denied both requests,¹⁶⁸ insisting that AT&T and MCI must offer the same prices nationwide.¹⁶⁹ AT&T, followed by MCI, quickly worked its way around this ruling, however, by offering extremely low in-state toll rates (5 cents a minute) to Connecticut customers who signed up as AT&T customers for all their long-distance services.¹⁷⁰ One day after AT&T cut in-state toll rates, SNET responded with a per-second billing plan – another effective price cut, in an industry that normally bills calls by the minute, and always rounds upward.¹⁷¹

¹⁶⁶AT&T Corp.'s Petition for Reconsideration at 2, Policy and Rules Concerning the Interstate, Interexchange Marketplace, CC Dkt. No. 96-61 (F.C.C. filed Sept. 16, 1996).

¹⁶⁷MCI Comments at 32, Policy and Rules Concerning the Interstate, Interexchange Marketplace, CC Dkt. No. 96-61 (F.C.C. filed Apr. 19, 1996).

¹⁶⁸Report and Order, Policy and Rules Concerning the Interstate, Interexchange Marketplace, 11 FCC Rcd 9564 (1996). AT&T's petition for reconsideration is still pending. AT&T Corp.'s Petition for Reconsideration, Policy and Rules Concerning the Interstate, Interexchange Marketplace, CC Dkt. No. 96-61 (F.C.C. filed Sept. 16, 1996).

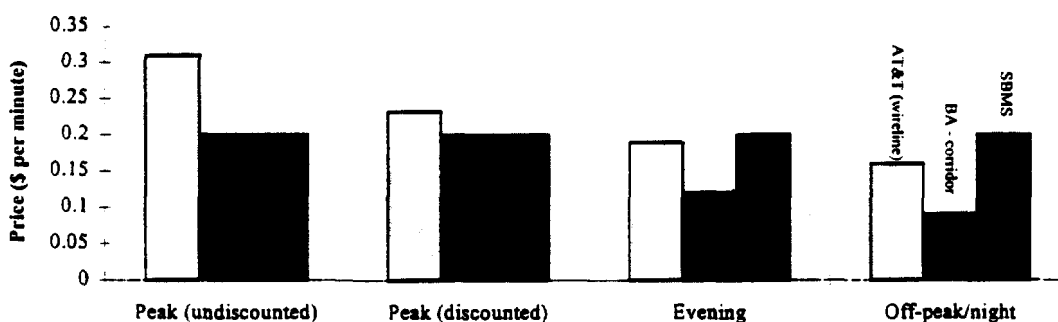
¹⁶⁹47 U.S.C. § 254(g); Report and Order, Policy and Rules Concerning the Interstate, Interexchange Market, 11 FCC Rcd 9564 (1996).

¹⁷⁰AT&T Press Release, *AT&T Offers New Low Price for Calling in Connecticut*, May 16, 1996. AT&T offered flat-rate discount in-state toll as a way to combat SNET's lower interstate rates. See W. Hathaway, *AT&T Making New Rate Offer in Connecticut*, Hartford Courant, May 17, 1996, at F1. MCI has offered a similar reduction in toll rates since April 1997. MCI Press Release, *MCI Launches Campaign to Save Connecticut Customers \$17 Million With Lower In-State Long Distance Telephone Bills*, PR Newswire, Apr. 15, 1997. AT&T has also offered \$75 coupons to customers in response to SNET's competitive pressure. R.C. Toole, et al., Merrill Lynch Capital Markets, Ind. Rpt. No. 1773825, Telecommunications Services, at 1 (Aug. 12, 1996).

¹⁷¹R.C. Toole, et al., Merrill Lynch Capital Markets, Ind. Rpt. No. 1773825, Telecommunications Services, at 1 (Aug. 12, 1996).

Connecticut's gains in long-distance markets came as little surprise to those who study the record in other markets. The 1996 Act frees Bell Companies to enter long distance in wireless markets. SBC, BellSouth, and other Bell Company cellular affiliates immediately began to offer flat-rate long distance at around 20 cents per minute, often with additional discounts for off-peak calls.¹⁷² Non-Bell cellular carriers responded quickly with steep cuts.¹⁷³ Overall, the long-distance cellular market is now much less concentrated than before Bell Companies were permitted to enter.¹⁷⁴ Similarly, in the two interLATA corridors where Bell Atlantic is allowed to compete, Bell Atlantic offers customers rates 30 to 40 percent below AT&T's, and has a market share of about 20 percent.¹⁷⁵ **Figure 22.**

Figure 22. Wireless and Corridor Long Distance Rates



As noted, local competition is developing faster in Connecticut than in almost any other state, and residential subscribers in Connecticut already benefit from it. But heightened

¹⁷² *US West Cellular Launches National Long-Distance Service*, Business Wire, Apr. 2, 1996. Ameritech's flat-rate prices vary from 16 to 24 cents per minute, depending on usage plans. T. Greene and D. Rohde, *Flurry of Activity Follows the Signing of New Telecom Law*, Network World, Feb. 19, 1996, at 12. BellSouth's PCS service charges a flat 20 cents per minute 24 hours a day. BellSouth Mobility DCS, Calling Outside Your Local Area, May 21, 1997, <http://www.bellsouthdcs.com/raleighpricing.html>.

¹⁷³ AT&T Wireless reduced long-distance rates for a nine-state area in the western United States. J. Rebchook, *AT&T Makes Long Distance Roaming Cheaper*, Rocky Mountain News, July 18, 1997, at 16B.

¹⁷⁴ AT&T had as much as 80 percent of the cellular interexchange market for SBC's customers before the Act passed. SBC had acquired a 10 percent market share by October 1996, and 55 percent of the market by mid-1997. SBC Press Release, *SBC Communications Earnings Up 11.0 Percent Record Third-Quarter Revenues and Operating Cash Flow*, PR Newswire, Oct. 17, 1996; SBC Press Release, *SBC Announces Second-Quarter Results: Strong Growth in Wireless Customers, Business Access Lines*, July 31, 1997.

¹⁷⁵ AT&T concedes that Bell Atlantic's rates are as much as one-third lower than AT&T's and credits Bell Atlantic's widespread marketing of "savings over AT&T basic rates" for Bell Atlantic's market share gains. AT&T Petition for Waiver of Section 64.1701 of the Commission's Rules at Att. A, CC Dkt. No. 96-26 (F.C.C. filed Oct. 23, 1996).

competition in long-distance markets alone has enriched Connecticut residential consumers by an estimated \$40 million a year – about \$7 per month¹⁷⁶ for households that sign up for SNET's cut-rate service. By comparison, residential local service in Connecticut averages about \$18 per month.¹⁷⁷ The important lesson is that the competitive gains in both residential and long-distance markets resulted from a single regulatory policy: Let competitors compete.

If competition can save \$7 a month for residential consumers in Connecticut, it can save comparable amounts for consumers in Texas and Florida, too. MIT's Professor Jerry Hausman estimates that extending comparable policies nationwide would yield consumer welfare benefits of \$7 billion per year.¹⁷⁸ Californians would gain \$900 million a year, or over \$7 per residential consumer per month. Texans would gain \$400 million, or just under \$7 per line per month; residential subscribers in Florida would gain over \$350 million per year – also about \$7 per month.¹⁷⁹ These benefits would be enjoyed by residential customers indefinitely into the future.¹⁸⁰ **Figure 23.**

¹⁷⁶If the interexchange carriers had been able to match SNET's rates statewide, the consumer welfare gain would have been about \$120 million statewide, or \$7 per month for every household in Connecticut.

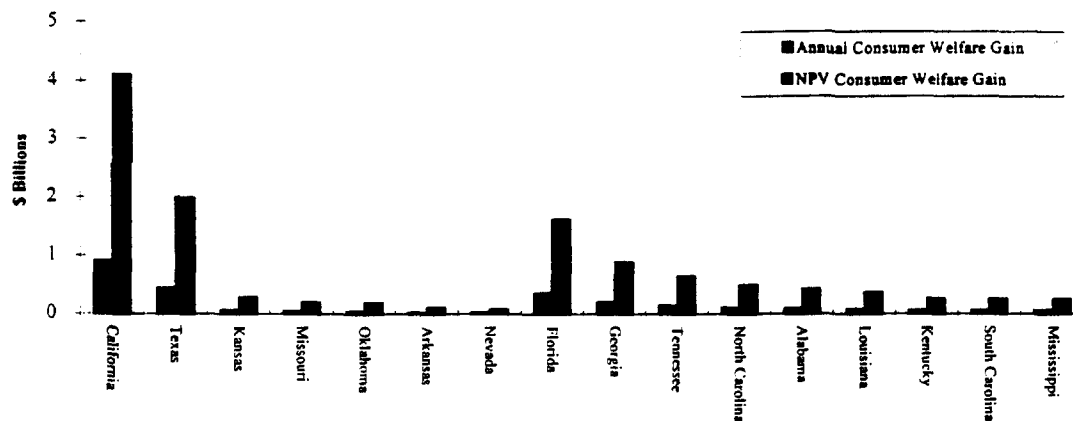
¹⁷⁷*FCC Reference Book* at App. 2.

¹⁷⁸*Hausman Decl.* at 14-15. These benefits take two forms: the first is the direct savings to consumers of lower prices for long distance; the second is the savings that would be enjoyed on the additional long-distance service purchased by consumers due to lower prices. Dr. Hausman calculates the direct savings at \$6.2 billion per year, and the benefits from additional long distance usage at \$406 million per year. *Id.* at 14.

¹⁷⁹This calculation applies Professor Hausman's methodology for calculating consumer welfare gains, *see id.* at 14, using an estimate for the size of the long-distance market in each state derived from FCC statistics. FCC, Preliminary Statistics of Communications Common Carriers (July 1997) at Tables 1.4, 2.6 (average revenue per interexchange minute), Tables 2.3, 2.5 (Bell Company residential lines per state); FCC, *Long Distance Market Shares* at Tables 9, 11 (July 1997) (interexchange minutes per residential line per state).

¹⁸⁰Figure 23 shows the five-year net present value of these gains, using a conservative 5 percent discount rate.

Figure 23. Consumer Welfare Gains from
Bell Company In-Region Long-Distance Entry



U.K. Experience. While competition is stalled in many residential local markets in the United States, it is booming in the United Kingdom. The contrast is instructive.

In July 1992, after a decade of deregulatory development, Britain authorized cable operators to provide competitive telephone service over their networks.¹⁸¹ Interconnection rules had been put in place some years earlier.¹⁸²

Today, five years later, the U.K. has over 20 facilities-based competitors offering local service at prices equal to, or in most cases below, British Telecom's rates.¹⁸³ SBC, U S West, and other Bell Companies have formed business alliances with U.K. cable companies and other competitors. Nearly 40 percent of U.K. households now have the option to purchase cable telephony; that figure is projected to rise to 75 percent by 2002.¹⁸⁴ Fully one-quarter of the households that can subscribe to competitive local service opt to do so.¹⁸⁵ **Figure 24.** More

¹⁸¹*OFTEL Brief History.*

¹⁸²OFTEL set the terms of interconnection for BT's and Mercury's networks in October 1985. *Ibid.*

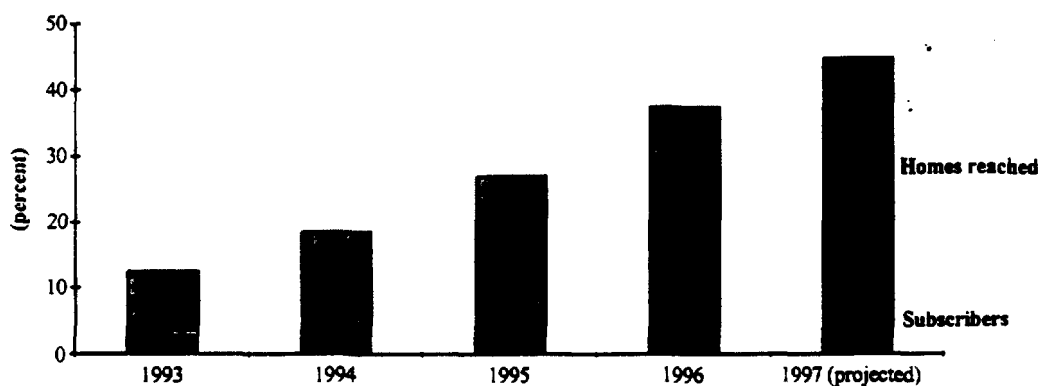
¹⁸³Applications and Notification, Volume One, at 33, The Merger of MCI Communications Corporation and British Telecommunications plc (F.C.C. Dec. 2, 1996) ("*BT/MCI Merger Application*"). BT's evening and nighttime rate in 1995 of 1.6 pence per minute was the same as MFS's daytime rate of 1.6, and higher than NYNEX's rate of 1.2. *Ibid.*

¹⁸⁴Opposition and Reply of British Telecom and MCI at 14, The Merger of MCI Communications Corporation and British Telecommunications plc, Dkt. No. 96-245 (F.C.C. filed Feb. 24, 1997).

¹⁸⁵Independent Television Commission, ITC Cable Statistics, <http://www.cable.co.uk> (7 percent of all residential lines are cable-based); International Telecommunications Union, World Telecommunications Development Report, 1995 (number of U.K. households); M. Fagan, *Government Backs £13bn BT-MCI Deal*,

customers subscribe to cable telephony than to cable video services;¹⁸⁶ telephone service generates more than half of cable operator revenues. Approximately 60,000 residential customers per month are switching from BT to the cable companies, resulting in negative growth for BT residential lines.¹⁸⁷ Competing carriers that target large businesses have captured 25 percent of the lines and 40 percent of the total telephone service expenditures of those customers.¹⁸⁸ The average U.K. phone bill – business and residential – dropped almost in half, in real terms, between 1991 and 1997.¹⁸⁹ BT has responded to competition by cutting costs and introducing innovative new pricing plans.¹⁹⁰ According to MCI, “[c]ompetition in U.K. local markets today significantly exceeds the level in the U.S. or in any other country.”¹⁹¹

Figure 24. Competitive Growth in the UK Residential Market



Sources: Independent Television Commission, ITC Cable Statistics, <http://www.cable.co.uk/new/stats/itcaug96.htm>; M. Lambert, et al., NatWest Securities Ltd., Ind. Rpt. No. 1856381, U.K. Telecommunications, at 54 (Feb. 12, 1997) (*NatWest Securities Report*); M. Fagan, *Government Backs £13bn BT-MCI Deal*, Evening Standard (London), Feb. 27, 1997, at 35.

Evening Standard (London), Feb. 26, 1997, at 35 (10 percent of all nationwide exchange lines are provided by BT competitors).

¹⁸⁶S. Pritchard, *Should You Get in Touch with Cable?: BT Is Facing Some Strong Competition*, The Independent (London), Mar. 9, 1997, at 20.

¹⁸⁷BT/MCI Merger Application at 26-27.

¹⁸⁸*Id.* at 25. “Large customer” is defined as a customer site with 20 or more access lines. Total expenditure is the sum of the charges for access lines plus local, national, and international calls.

¹⁸⁹C. Godsmark, *BT Residential Customers Lose Despite Competition*, The Independent (London), June 6, 1997, at 23.

¹⁹⁰J. Ivison, *Scottish Challenge to BT*, The Scotsman, Mar. 28, 1997, at 25. See also, S. Pritchard, *Should You Get in Touch with Cable?: BT Is Facing Some Strong Competition*, The Independent (London), Mar. 9, 1997, at 20 (two of BT’s discount plans, Premierline for high-spending customers and Light User Scheme for low-usage customers, have narrowed the cable pricing gap).

¹⁹¹BT/MCI Merger Application at 24.

All of this has occurred under a regulatory regime very different from our own. U.K. competitors interconnect with BT's network at prices ultimately determined by OFTEL, the British counterpart to the FCC. OFTEL makes no attempt to push prices down to long run incremental cost; BT recovers both its fixed and its variable costs.¹⁹² Nor is BT required to sell its local services to competitors at wholesale rates, and OFTEL expressly declined to require BT to provide access to elements of its local networks on an unbundled basis.¹⁹³ Regulations on toll-call dialing parity are also much less demanding than in the United States.¹⁹⁴ **Table 7.** In a recent filing with the FCC, MCI nevertheless declared that the U.K. has "fully opened its telecommunications business to effective competition."¹⁹⁵ As competition has developed, British regulators have deregulated. Price regulation has been eliminated entirely from business and high-usage residential markets.¹⁹⁶ The proportion of BT's revenues under direct regulation has fallen from 65 percent to around 25 percent.¹⁹⁷

Table 7. Regulation: U.S. vs. U.K.		
Requirement	US	UK
Resale	Yes ¹	No ²
Unbundling	Yes ³	No ⁴
TELRIC	Yes ⁵	No ⁶
Dialing parity	Yes ⁷	No ⁸
Separate long-distance affiliate	Yes ⁹	No

¹⁹²British Telecommunications, Form 20-F, at 12, 17 (S.E.C. July 5, 1996); *see also* BT Response to OFTEL's Effective Competition: Framework for Action – Ch. 2 ¶¶ 6-12, (Oct. 1995); Pricing of Telecommunications Services from 1997: OFTEL's Proposals for Price Control and Fair Trading ¶ 4.56-4.59 (1996).

¹⁹³Statement Issued by the Director General of Telecommunications, OFTEL's Policy on Indirect Access, Equal Access and Direct Connection to the Access Network at ¶¶ 41-47 (July 1996).

¹⁹⁴*Id.* at ¶¶ 9, 23, 36-37.

¹⁹⁵Opposition and Reply of British Telecom and MCI at 14, The Merger of MCI Communications Corporation and British Telecommunications plc, Dkt. No. 96-245 (F.C.C. filed Feb. 24, 1997).

¹⁹⁶*NatWest Securities Report* at 5.

¹⁹⁷*Ibid.*

Sources: ¹⁴⁷47 U.S.C. §§ 251(b)(1), (c)(4). ¹⁴⁸*Id.*; British Telecommunications, Form 20-F, at 12, 17 (S.E.C. July 5, 1996); OFTEL, Promoting Competition in Services Over Telecommunications Networks ¶ 4.12. ¹⁴⁹47 U.S.C. §§ 251(c)(2), (3), (6). ¹⁵⁰OFTEL Statement at ¶ 41; BT License ¶ 13.1(a). ¹⁵¹47 U.S.C. § 252(d)(1); First Report and Order ¶ 29, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Dkt. No. 96-98 (FCC Aug. 8, 1996). ¹⁵²BT Response to OFTEL's Effective Competition: Framework for Action - Ch. 2 ¶¶ 6-12 (Oct. 1995); see also Pricing of Telecommunications Services from 1997: OFTEL's Proposals for Price Control and Fair Trading ¶¶ 4.56- 4.59 (1996). ¹⁵³47 U.S.C. §§ 251(b)(3), 271(c)(2). ¹⁵⁴OFTEL Statement at ¶¶ 9, 23, 36-37. ¹⁵⁵First Report and Order and Further Notice of Proposed Rulemaking, Implementation of the Non-Accounting Safeguards of Sections 271 and 272 of the Communications Act of 1934, as Amended, FCC 96-489, CC Dkt. No. 96-149, at ¶ 15 (rel. Dec. 23, 1996).

Local Competition in Perspective. Promoting competition in the provision of basic voice service to residential markets is an important policy objective. But less important than it may at first appear. Local telephony remains strictly regulated – at both the state level, where retail prices and service are closely regulated, and at the federal level, where wholesale prices and competitor access are regulated. Rates charged by local phone companies will remain regulated so long as local phone companies retain high market shares in residential markets. Even if regulation itself is what maintains those market shares by keeping price well below cost. No amount of competition can spur any provider to deliver service cheaper than that.¹⁹⁸

When a market is so closely regulated, the benefits of new competition are sharply diminished.¹⁹⁹ If new entrants rely on resale, rather than their own facilities, to compete in local markets, the consumer benefits of competition are lower still. Resale alone has little market-disciplining effect because a reseller competes only for the “marketing” slice of the overall service cost – the 20 percent or so gap between retail and wholesale. The potential for cost reduction or service enhancement is accordingly limited.²⁰⁰ In Connecticut, where AT&T resells SNET local service, its monthly rate is 25 cents lower than SNET's.²⁰¹ By contrast, SNET's price cuts in long-distance markets saved consumers about \$7 per month. As Professor Hausman

¹⁹⁸Courts have recognized that, where regulation accomplishes the pricing constraints usually driven by competition, there is less concern that a lack of additional competitors “would or could have any effect upon prices in the market or otherwise deprive purchasers or consumers of the benefits they derive from free competition.” *Redwing Carriers, Inc. v. McKenzie Tank Lines*, 443 F. Supp. 639, 641 (N.D. Fla. 1977), *aff'd*, 594 F.2d 114 (5th Cir. 1979); see also Letter from James R. Young, Bell Atlantic, to Joel Klein, Acting Assistant Attorney General, Antitrust, at 7-8 (Jan. 16, 1997).

¹⁹⁹See, e.g., *Town of Concord v. Boston Edison Co.*, 915 F.2d 17 (1st Cir. 1990), *cert. denied*, 499 U.S. 931 (1991); *Kartell v. Blue Shield of Massachusetts, Inc.*, 749 F.2d 922 (1st Cir. 1984), *cert. denied*, 471 U.S. 1029 (1985).

²⁰⁰The 1996 Act makes resale a particularly unlikely tool for forcing an incumbent phone carrier to lower its prices. Under section 251, wholesale price is a fixed percentage of retail price, and therefore the incumbent has no competitive advantage to gain by lowering retail price. 47 U.S.C. § 251; First Report and Order at ¶ 32, Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Dkt. No. 96-98 (F.C.C. Aug. 8, 1996).

²⁰¹D. Haar, *AT&T to Begin Basic Service in State March 1*, Hartford Courant, Feb. 15, 1997, at A1. AT&T offers its customers a single bill for local, local toll, and long-distance, but does not offer a discount on the bundle.

concluded, "the consumer welfare gains from increased competition in long distance will more than outweigh the incremental gain from the last step to regulatory perfection that the Commission[] . . . demands."²⁰²

The worse the economic prospects of local competition, the more important it is to get the regulatory priorities straight. GTE and Sprint, for example, provide local service to about 18 million and 7 million customers respectively²⁰³ – but almost entirely in rural areas,²⁰⁴ where costs are highest, and where residential service is typically subsidized the most. Regulators have repeatedly recognized that local competition will arrive in such areas last, if it ever arrives at all.

Table 8.

Table 8. Competitive Prospects For Rural Areas
<p>"(I)t is unlikely that there will be competition in a significant number of rural, insular, or high cost areas in the near future."¹ (FCC, 1996)</p>
<p>"In certain (most likely rural) markets, it is possible that . . . entry will not be forthcoming in the foreseeable future."² (Joel Klein, DOJ, 1997)</p>
<p>"Competition . . . may never develop in certain remote, rural, low-density areas."³ (Missouri PSC, 1996)</p>
<p>"It is far from clear that substantial local competition will develop for rural or suburban customers."⁴ (Competitive Telecommunications Association, 1994)</p>
<p>"[R]ural [areas] will not see competition at a local level."⁵ (Washington Citizens Action, 1997)</p>
<p>Sources: ¹Universal Service Order at ¶ 324. ²Joel Klein, Acting Chief of DOJ Antitrust Division, quoted in <i>Burns Lifts Hold On DOJ Antitrust Nomination</i>, Communications Today, June 13, 1997. ³Prepared Testimony of Martha S. Hogerty, Missouri Public Counsel, before the Senate Committee on Commerce, Science and Transportation on the Implementation of the Telecommunications Act of 1996, June 18, 1996. ⁴Opposition of Competitive Telecommunications Association at 7-8, <i>United States v. Western Elec. Co.</i>, No. 82-0192 (filed Nov. 16, 1994). ⁵C. Flash, <i>Communications Cafeteria: Analysts Brace for "Wild" Time As Telecommunications Deregulation Generates Choices That Can Boggle the Minds of Consumers</i>, News Tribune, Jan. 5, 1997, at F-1.</p>

Fortunately for many of these customers, however, the 1996 Telecom Act freed GTE to bundle long-distance with local exchange service.²⁰⁵ GTE began doing so in March 1996, about

²⁰²Hausman Decl. at 18.

²⁰³FCC, *Preliminary Statistics of Communications Common Carriers*, at Table 2.10 (June 1997).

²⁰⁴See, e.g., G.W. Woodlief, et al., Prudential Securities, Co. Rpt. No. 2539125, GTE, at 2 (Mar. 10, 1997), ("About 90 percent of GTE's core local telephone properties are located in rural or suburban territories."); B. Bath, et al., Lehman Brothers, Co. Rpt. No. 1719853, Sprint, at 2 (Mar. 27, 1996) (noting the "rural and suburban nature of Sprint's local telcos")

²⁰⁵Telecommunications Act of 1996 at § 601(a)(2).

two years after SNET.²⁰⁶ GTE immediately undercut AT&T by 14 to 35 percent.²⁰⁷ After one year of service, GTE has already signed up one million mainly residential customers, or just over 5 percent of subscribers in its service areas.²⁰⁸ Professor Hausman estimates the consumer welfare gains to the United States from nationwide residential long-distance competition on this scale would again be in the \$7 billion range annually, or \$5 per customer per month.

Sprint has the same freedom to compete, but different incentives. Unlike GTE, Sprint is also a national long-distance provider, with 5 million presubscribed residential customers²⁰⁹ and \$2.5 billion in residential long-distance revenue. Over 80 percent of that business comes from customers who buy their local phone service from Bell Companies. Signing an additional 20 percent of its own local customers for Sprint long-distance service would add roughly 1.4 million new Sprint customers,²¹⁰ but losing 30 percent of existing Sprint customers to Bell Company long-distance competitors in Bell regions would subtract somewhat more. Keeping the Bells caged therefore remains the best competitive strategy for Sprint. Particularly because the 1996 Act prohibits Sprint from bundling or jointly marketing interexchange service and resold local service in most Bell Company regions until the Bell Company itself wins the right to market similar bundles.²¹¹

Experience from Connecticut, the U.K., and the GTE territories unambiguously supports the same conclusion. The important challenge for policy makers is not how to promote competition to provide the single component of residential service that is already ubiquitous and artificially cheap. It is to promote competition in the entire bundle of services that residential consumers buy. Over the longer term, the objective must be to promote new investment in advanced services, and to make sure that the investment is not channeled only to the many profitable peaks of the market, and away from the one unprofitable valley.

²⁰⁶*GTE Brings Affordable Long-Distance Calling to Consumers with Lowest Per-minute Flat Rate of All Major Long-Distance Carriers*, Edge, Jan. 20, 1997.

²⁰⁷Professor Hausman estimated that GTE's residential rates, on average, were 17 percent lower than AT&T's. *Hausman Decl.* at 16.

²⁰⁸M.J. Balhoff, et al., Legg Mason Wood Walker, Inc., Co. Rpt. No. 1915715, AT&T, at 2 (June 2, 1997).

²⁰⁹Sprint has 5 percent of presubscribed residential access lines nationwide. *FCC Long Distance Market Shares* at Table 9 (July 1997).

²¹⁰Sprint already provides long distance to about 10 percent of its local customers. PNR Associates, Call Detail database (1996).

²¹¹47 U.S.C. § 271(e)(1).

5. PROMOTING NEW INVESTMENT IN BROADBAND SERVICES

The benefits to be gained from new investment in telecom infrastructure, both local and long distance, have never been greater. The Internet is the most important development in mass communications of our times. It is a major driver of economic growth in the United States²¹² and around the globe.²¹³

Demand for bandwidth is rising very rapidly. The Internet had 19 million host computers in July 1997, over 20 times the number five years earlier.²¹⁴ The number of Internet Service Providers (ISPs) in the United States doubled in 1995 alone.²¹⁵ The Net serves an estimated 51 million U.S. subscribers today,²¹⁶ double what it served a year ago.²¹⁷ According to WorldCom, demand for bandwidth is doubling every 3½ months.²¹⁸ **Figure 25.**

²¹²Comments of the United States Internet Providers Association at i, Usage of the Public Switched Network by Information Service and Internet Access Providers, CC Dkt. No. 96-263 (F.C.C. filed Mar. 24, 1997).

²¹³K. Werbach, Office of Plans and Policy, FCC, OPP Working Paper 29, Digital Tornado: The Internet and Telecommunications Policy at iii (Mar. 1997).

²¹⁴Network Wizards, Internet Domain Name Survey, July 1997, <http://www.nw.com/zone/WWW/report.html>. A host used to be a single machine on the Net. Today, a single computer may host multiple systems (with multiple domain names and Web addresses).

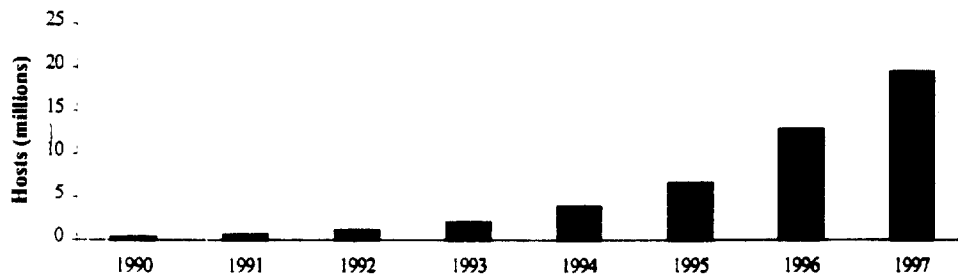
²¹⁵J. Rickard, Introduction, Boardwatch Magazine Directory of Internet Service Providers, July/Aug. 1997, at 5.

²¹⁶IntelliQuest Press Release, *Latest IntelliQuest Survey Counts 51 Million American Adults On The Internet/Online Services In The Second Quarter 1997*, Sept. 4, 1997.

²¹⁷Remarks by the President to the People of Knoxville, Oct. 10, 1996, <http://www.pub.whitehouse.gov/white-house-publications/1996/10/1996-10-10-president-and-vp-remarks-in-knoxville-tn.text>.

²¹⁸M. MacLachlan, *WorldCom Makes Megadeals to Develop Network Infrastructure*, InternetWeek, Oct. 6, 1997.

Figure 25. Growth of Internet Host Servers

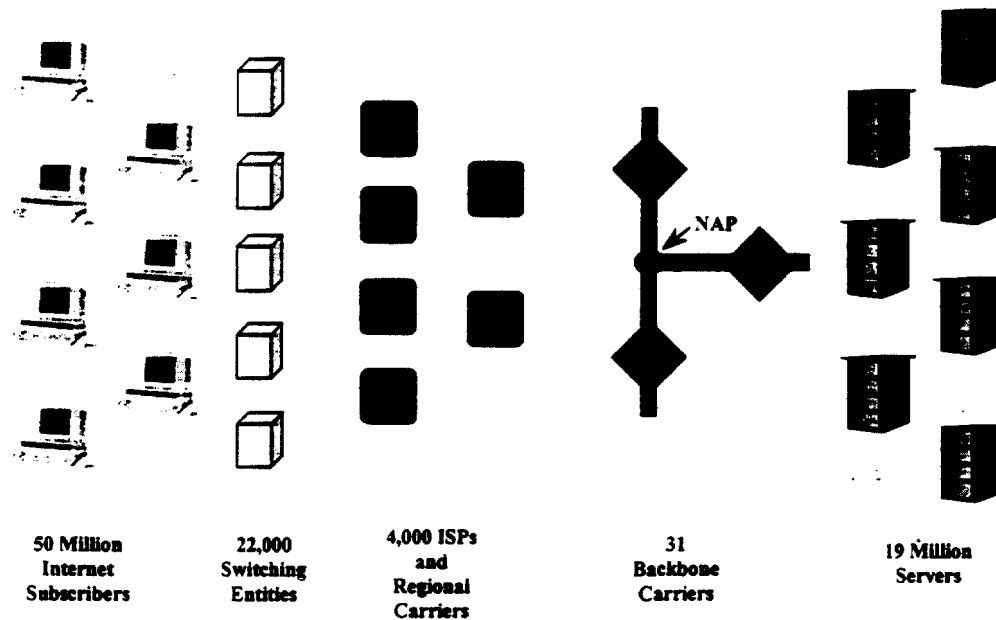


Demand is surging, but key components of the supply chain are not keeping pace. The supply of Internet bandwidth is lagging seriously, especially for residential subscribers. The reasons are again rooted in regulatory policies that block entry by the companies most able to meet the surging demand, and with the strongest incentives to do so.

The Internet divides roughly into five layers.²¹⁹ **Figure 26.** At the lowest level are some 50 million users – or more precisely, their computers, serial ports, modems, and ISDN adapters. The users connect to the next level up, local access, mainly through the local phone companies, using some 136 million access lines, countless miles of fiber and copper wire, and 22,000 local switches. Local phone lines link users to about 4,000 Internet Service Providers (ISPs). The largest ISPs include America Online, CompuServe, Microsoft Network, AT&T, and WorldCom's UUNet division.

²¹⁹See generally J. Rickard, Internet Architecture, Boardwatch Magazine Directory of Internet Service Providers, July/Aug. 1997, at 6.

Figure 26. Internet Architecture



The ISPs receive the incoming calls and connect them to Internet routers, from which they are passed on to larger ISPs until they reach the “backbones” that carry Internet traffic across the United States and the world. Some 29 national providers operate Internet backbone networks.²²⁰ The backbone providers connect their networks at 11 major “network access points” (NAPs).²²¹ About nine backbones – including AT&T, MCI, Sprint, UUNet, and AOL – comprise an elite group of “peers” that pass traffic back and forth at no cost, and handle the vast majority of traffic.

The final elements of the Internet are the 19 million servers, the computers on which content is stored and transactions are executed. Some of these computers are operated by ordinary “users,” some by ISPs like AOL, CompuServe, and Microsoft, others by dedicated Web content providers like HotWired and Salon, still others by traditional commercial enterprises like

²²⁰J. Rickard, *Measuring the Internet*, Boardwatch Magazine Directory of Internet Service Providers, July/Aug. 1997, at 20.

²²¹J. Rickard, *Internet Architecture*, Boardwatch Magazine Directory of Internet Service Providers, July/Aug. 1997, at 8-13. These interconnection points are: four official Network Access Points (NAPs) in San Francisco, Chicago, Washington, D.C., and Pennsauken, New Jersey; four Metropolitan Area Exchanges (MAEs) operated by MFS in San Jose, Los Angeles, Dallas, and Chicago; two Federal Internet Exchanges (FIXes) in Mountain View, California and College Park, Maryland; and a Commercial Internet Exchange (CIX) in Santa Clara, California.

banks and airline companies.

Demand for Internet services is fast outstripping supply. Contrary to many popular perceptions, the worst problems of blocking and slow speeds in the Internet today are centered not in the local exchange, but in the networks among the ISPs and backbone carriers. A recent, major study of 29 of the then 31 Internet backbones conducted Internet trials in 30 cities, using download measurements taken every 15 minutes for 30 days.²²² The study found that on average, users cannot download across the backbone networks faster than about 40 kilobits per second – significantly slower than a 56 kbps modem, less than a third of the top speed of full ISDN (128 kbps), and slower still than forecasted speeds for ADSL (6 Mbps) or cable modems (10 Mbps).²²³ And the 40 kbps figure represents a 20 percent decrease in the average speed of the Internet since this summer, when Keynote and Boardwatch calculated the average speed at about 50 kbps.²²⁴ The network access points (NAPs), where the backbone networks interconnect, are a further source of congestion.²²⁵

As a result of the congestion on the backbone networks, users complain that they do not see the benefit of faster connections using ISDN or cable modems.²²⁶ Residential users cannot be

²²²Keynote Press Release, *Keynote Systems Clocks True Speed On The Internet Highway At 5,000 Characters Per Second, or Only 40 Kbps*, Oct. 21, 1997.

²²³Download speeds are significantly slower when users connect during popular business or evening hours, or for users connecting in more congested parts of the country. *Ibid.* Jim Barrick, President and CEO of Keynote, noted that, "Most Web users will actually experience performance worse than the measured average. That's because our measurements were conducted over faster connections than most users have available and included measurements performed at night when traffic was light." Keynote measured Internet speed using T-1 or T-3 connections only one or two router "hops" from the backbones themselves; residential users will likely not have such fast or close connections. *Ibid.*

²²⁴See J. Rickard, *Internet Backbone Measurement Results*, Boardwatch Magazine Online, July 1997, <http://www.boardwatch.com/MAG/97/JUL/bwm22.htm>.

²²⁵According to one analyst, WorldCom's MAE East in Washington, D.C. handles more than 60 percent of all worldwide traffic and an estimated 85 percent of all intra-European traffic. Any traffic running through this NAP is choked by mediocre bandwidth. J. Dvorak, *Breaking Up the Internet Logjam*, PC Magazine, Apr. 8, 1997, at 87.

²²⁶This "means that performance of next-generation technology such as cable-TV or satellite modems will be severely limited, at least until overall Internet throughput for standard Web content is substantially improved." Keynote Press Release, *Keynote Systems Clocks True Speed On The Internet Highway At 5,000 Characters Per Second, or Only 40 Kbps*, Oct. 21, 1997. "[Y]ou have to wonder exactly what these cable modem boosters are about. While it's possible for a cable modem to get the home Web page from the local cable modem server at some blazing speed, this is simply misleading if the average time of all the backbones is 50 kbps. 50 kbps is the average speed you will get, period! [Similarly,] 128K ISDN . . . isn't that useful." J. Dvorak, *Slower Than You Think*, PC Magazine Online, Aug. 11, 1997. See also R. Gareiss, *Mapping a High-Speed Strategy*, Data Communications, Apr. 1997, at 62 ("Increasing the speed of the local loop won't work miracles with sluggish Internet access, since factors like server speed and congestion at Internet NAPs . . . affect actual throughput."); D. Hoye, *Cox @Home*;

expected to spend more for Internet access until they can be assured that the product they are buying is fast and reliable. Until adequate bandwidth and stable backbones are built, consumer adoption of ADSL and ISDN, and of competing technologies like cable modems, will be delayed.²²⁷

Thus, despite frequent allegations to the contrary, the local exchange is not currently the main choke point for Internet traffic.²²⁸ Analog phone lines can still accommodate the 56 kbps of the fast modems now on the market, and ISDN lines, supporting 128 kbps rates, are available to 93 percent of subscribers nationwide, both residential and business. But the problems in the upper regions of the network are being addressed, albeit more slowly than they should or could be. Over the next few years there clearly will have significant new investment in local facilities, too, or local networks will replace the backbones as the choke points in the system.

Impediments to New Investment in Internet Backbone Networks. At the level of the Internet backbone, AT&T and MCI show little promise as architects of the network of the future. Both companies have announced and then killed a succession of data and Internet services.²²⁹ AT&T recently announced activation of a "high-performing" Internet backbone,²³⁰ but the prospects for this latest venture must be judged in light of AT&T's late arrival, limited

The Access Is Easy; But Even its Fast Speed Can't Overcome Peak-Time Congestion On The Internet, Arizona Republic, Oct. 13, 1997, at E1 ("I've found that roaming the Internet with souped-up access doesn't guarantee great results.")

²²⁷Indeed, the inability of the backbones to provide sufficient bandwidth to allow users to take full advantage of cable modem transmission speeds was one of the reasons TCI helped found the "@Home backbone." B. Dalglish, *Investors Bet Big on Pure Cable-Modem Play*, The Financial Post, Oct. 9, 1997, at 31.

²²⁸The Keynote study concluded that "most of [many websites'] performance problems occur out in the Internet's infrastructure somewhere between the web site and its users: at the NAPs (Network Access Points) where backbone providers interconnect, in one or more routers along the communication path, or in a DNS (Domain Name Service) close to the user." Keynote Systems, Top 10 Discoveries About the Internet, <http://www.keynote.com/measures/top10.html>.

²²⁹In May 1994, AT&T announced that it would offer three on-line services in 1995: NetWare Connect Services, Network Notes, and PersonaLink. Less than three years later, AT&T was substantially out of the on-line industry, with the exception of its WorldNet Internet services (begun in February 1996). K. Patch, *Integration Key to AT&T's On-Line Plan*, PC Week, May 30, 1994, at 14; J. Davis, *AT&T Shifts to WorldNet on NetWare Connect Services*, InfoWorld, July 15, 1996, at 12; J. Schwartz, and J. Rendleman, *AT&T Drops Notes in Face of Internet*, Communications Week, Mar. 4, 1996, at 1; P. McKenna, *AT&T Ends PersonaLink Service*, Newsbytes, July 12, 1996; P. McKenna, *America Online Acquires The Imagination Network*, Newsbytes, Aug. 7, 1996. MarketplaceMCI, "one of the most notable Internet business collapses," vanished from the Internet after "fail[ing] to attract sufficient sales." S. Alexander, *Christmas Shopping Has New Meaning on the Net*, Star Tribune, December 14, 1996, at 1A.

²³⁰AT&T Press Release, *AT&T Announces Business-Quality IP Services, Its High-Performing IP Backbone*, Oct. 8, 1997.

involvement, and even more limited success in Internet markets in the past.

AT&T and all other long-distance carriers who derive most of their current revenues from voice must recognize that growth of the Internet threatens their profits almost as much as Bell Company entry into long-distance markets. Existing voice customers pay for service on a per-minute-of-use basis. Long-distance carriers therefore have an incentive to keep the Internet noncompetitive with their existing high-margin services, most particularly in the arenas of 800 numbers,²³¹ fax transmission, and international toll calls.

This may explain why WorldCom, almost unknown a few years ago, is fast emerging as "the King of the Internet."²³² If WorldCom's proposed acquisition of MCI goes through, the combined firm will own 45,000 route miles of fiber²³³ and will be by far the largest provider of Internet access and backbone services.²³⁴ WorldCom owns and operates UUNet, through which – consistent with its general strategy of serving only business customers, not residences – WorldCom provides Internet services directly to businesses and ISPs.²³⁵ In September 1997, WorldCom purchased the America Online and CompuServe fiber networks,²³⁶ but did not take

²³¹Federal Express, for example, has installed a package tracking website that receives 107,000 hits per day. These inquiries substitute for calls to FedEx's 800 number, and thereby diminish the long-distance carriers' lucrative pay-by-the-minute 800 services. The FedEx Web site uses only 1/25 as much long-distance circuit capacity per customer inquiry as the 800 service. To use the site, the user needs to download two Web pages, the standard tracking page and the page that contains the tracking results. These two pages (excluding unnecessary graphics) represent roughly 120,000 bits. Using FedEx's automated calling system, on the other hand, ties up a voice channel for about 46 seconds. A voice conversation converted into digital form requires 64 kbps. The automated calling system therefore uses capacity equal to that needed to transmit 2.8 million bits. N. Negroponte, *Psst! Transactions*, *Forbes*, July 7, 1997, at 166.

²³²M. Landler, *The Battle For MCI: The Offer; Upstart Offering \$30 Billion To Buy MCI, Using Stock*, *N. Y. Times*, Oct. 1, 1997, at A1; see also J. Sandberg, *How One Company Is Quietly Buying Up the Internet*, *Wall St. J.*, Sept. 9, 1997, at B1 ("acquisitions have turned WorldCom into an Internet giant").

²³³K. Gerwig, *Q&A: Sidgmore Speaks On The Proposed MCI Deal*, *InternetWeek*, Oct. 3, 1997, <http://www.techweb.com/wire/news/1997/10/1003sidgmore.html>.

²³⁴The merger would combine the networks of UUNet, CompuServe, America Online, and MCI. By some measures, UUNet's and MCI's networks are the largest in the United States. *Brooks Fiber Acquired: WorldCom Makes Unsolicited \$29-Billion Stock Btd for MCI, Topping BT Offer*, *Communications Daily*, Oct. 2, 1997; J. Rickard, Introduction, *Boardwatch Magazine Directory of Internet Service Providers*, July/Aug. 1997, at 4.

²³⁵See 1996 WorldCom Annual Report 28 (1997) (UUNet is the world's largest provider of Internet access services to "businesses, professionals and on-line services providers"); see also S. Comfort, et al., *Morgan Stanley, Dean Witter, Co. Rpt. No. 2556537*, WorldCom Inc., at 10 (June 3, 1997) (UUNet's services are "tailored to meet the needs of business customers").

²³⁶According to the Keynote study of backbone performance, CompuServe's network is "the best performing network on the Internet." J. Rickard, *Measuring the Internet*, *Boardwatch Magazine Directory of Internet Service Providers*, July/Aug. 1997, at 24. In comparison to average backbone speeds of 50 Kbps, CompuServe's backbone delivers roughly 300 kbps. The backbones operated by UUNet and ANS, by contrast,

their subscriber bases, a combined 14 million strong.²³⁷ Rather than attempt to break into the residential online service market itself, WorldCom purchased only extra capacity for its commercial and ISP Internet access business. WorldCom's proposed acquisitions of MCI and Brooks Fiber would both add high-margin, business-only elements to WorldCom's network and service offerings. By doing little to add to Internet infrastructure, incumbent long-distance carriers have left the field largely to a single ambitious upstart that is buying up large parts of the infrastructure already in place.

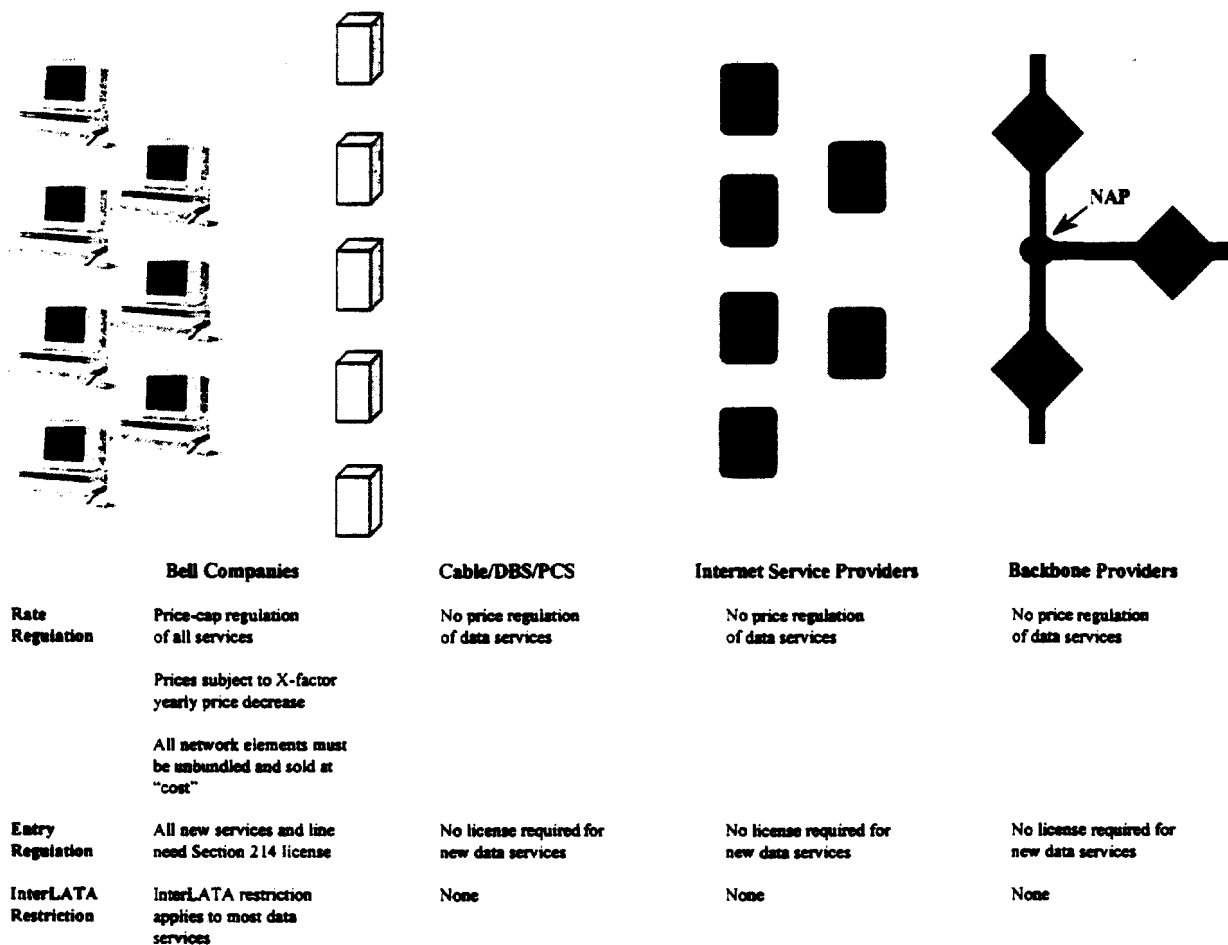
In these circumstances, Bell Companies clearly should be playing integral roles in supplying new Internet bandwidth, not only for local access, but up through the higher tiers of the network as well. The Bell Companies certainly have the right incentives to invest in this market, because the growth of the Internet helps them to sell additional telephone lines and new local bandwidth through services like ISDN. Unlike the incumbent long-distance companies, local phone companies have much to gain by migrating customers, residential customers in particular, off subsidized, flat-rate analog lines and onto high-capacity, properly priced, digital lines. But most of the local telephone companies (aside from GTE) are legally barred from providing Internet backbone services.²³⁸ The current regulations that apply to Internet services discourage only one class of provider – the Bell Companies. **Figure 27.**

perform only at about average speeds. J. Rickard, *Measuring the Internet*, Boardwatch Magazine Directory of Internet Service Providers, July/Aug. 1997, at 26-27; J. Dvorak, *Slower Than You Think*, PC Magazine Online, Aug. 11, 1997, <http://www8.zdnet.com/pcmag/insites/dvorak/jd970811.htm>.

²³⁷*EarthLink Pins Growth on Two-Fold Strategy Key Elements Involve Referral, Acquisition Programs*, InternetWeek, July 14, 1997.

²³⁸47 U.S.C. § 271. The Bell Companies may act as ISPs to a limited extent, but by most constructions of the 1996 Act are forbidden from arranging the long-distance transport over the backbone networks on behalf of the customer. As a result, customers of Bell Company ISP services must choose a second ISP to handle the long-distance connections, and the customers receive separate charges from each ISP. The extra bill has been a significant deterrent to the Bell Companies offering a competitive service.

Figure 27. FCC Regulation of Data Services



Impediments to Competitive Investment in Internet Access Networks. A second cluster of regulatory policies is creating equally strong disincentives to new investment in local Internet access facilities. Under the 1996 Act, Bell Companies are now required to "unbundle" and sell to their competitors whatever new capabilities and services they add to their networks,²³⁹ at rates "based on the cost[s] of providing" them.²⁴⁰ On new, risky investment in facilities and services that turn out to be very popular, Bell Companies can therefore hope to recover only their original costs. New, risky investments that fail, by contrast, are charged to Bell Company shareholders, through the vehicle of price-cap regulation.

Worse still, all Bell Company prices must be deflated according to a "productivity offset"

²³⁹47 U.S.C. § 251.

²⁴⁰47 U.S.C. § 252(d).

or "X-factor" concocted by the FCC. The FCC's latest Price Cap Order sets the X-Factor at a level that the FCC itself has admitted is well in excess of what is "reasonable,"²⁴¹ thus threatening to choke off investment in new advanced services. Regulation alone may thus transform any well-engineered, efficiently priced, new broadband service into a source of steadily growing loss in subsequent years. The more advanced the technology deployed, the greater the threat, because in such circumstances further technological advance is least likely to deliver the instant, ongoing improvements in performance and declines in price that the Commission presumes into existence indefinitely into the future.

Under existing regulatory structures, almost any increase in bandwidth re-engages a snake's nest of old regulatory pricing debates. ISDN, for example, is one line that contains either three (for Basic Rate Interface ISDN) or 24 (for Primary Rate Interface ISDN) digital channels. It took the FCC over two years to decide whether such lines should therefore be subject to one, not three or 24, subscriber line charges; the Common Carrier Bureau and the Commission as a whole reached opposite conclusions.²⁴² That was in 1995. In 1997, the Commission changed course: it ordered one, newly-calculated, ISDN-only SLC to be charged per ISDN line, but changed the amount of the SLC.²⁴³ The SLC helps to pay for interstate uses of local networks. Meanwhile, many of those who use local phone networks most heavily to reach the Internet pay no access charges at all.²⁴⁴ The FCC recognized in 1987 that this distinction made no sense — interstate data callers use precisely the same local access lines as interstate voice callers, and indeed (on a per-customer basis) use them much more heavily.²⁴⁵ But the disparate treatment

²⁴¹The FCC set the X-factor at 6.5 percent, even though historical productivity gains (the measure the Commission admittedly considers most reliable) have never showed productivity gains even approaching 6.5 percent. See Fourth Report and Order at ¶¶ 137, 141, Price Cap Performance Review for Local Exchange Carrier, CC Dkt. No. 94-1 (F.C.C. May 21, 1997).

²⁴²Notice, Common Carrier Bureau Will Not Enforce Current Rules on Application of Subscriber Line Charges to ISDN Service, 10 FCC Rcd 13473 (1995), *rev'g*, Memorandum Opinion and Order, NYNEX Telephone Companies, Revisions to Tariff F.C.C. No. 1, Transmittal No. 116, 7 FCC Rcd 7938 (Com. Car. Bur. 1992), *aff'd on recon.*, 10 FCC Rcd 2247 (1995).

²⁴³*Access Charge Reform Order* at ¶ 116. Because PRI costs five times as much to provide as basic service, the PRI SLC was set at five times the basic SLC, subject to a cap of \$45; because BRI costs about the same as regular service, the BRI SLC was set to equal the regular SLC. *Ibid.* The LECs are also allowed to assess additional end-user charges to recover the additional costs of ISDN line cards. *Access Charge Reform Order* at ¶ 126.

²⁴⁴Order, Amendments of Part 69 of the Commission's Rules Relating to Enhanced Service Providers, 3 FCC Rcd 2631 (1988).

²⁴⁵Notice of Proposed Rulemaking, Amendments of Part 69 of the Commission's Rules Relating to Enhanced Services Providers, 2 FCC Rcd 4305 (1987).

remains in place, because in the ten years since, nobody has been able to muster a political consensus on how to correct it.²⁴⁶

This regulatory environment leaves new entrants with little incentive to invest in local residential markets. Even if they put aside concerns about unleashing the Bells, they cannot ignore the fact that – under current regulatory mandates – reselling Bell service is by far the cheapest way to enter most local residential markets. Every major player has reached that conclusion. “There’s not one company that intends to enter the local market by duplicating the local networks that already exist today,” declared AT&T’s former chief executive Robert Allen. “That would be redundant, not to mention financially prohibitive. Instead, companies like AT&T intend initially to buy service from the local companies at a discount and resell the service to their own customers.”²⁴⁷ Sprint likewise says it will focus on a “resale approach that does not entail a significant up-front investment;” the company won’t invest in infrastructure “until it becomes clear to us that regulatory conditions exist that would support a significant financial commitment.”²⁴⁸ One of MCI’s potential new owners, British Telecom, says it will “purchase bulk capacity from local telephone carriers” and thereby “leverage other people’s infrastructure.”²⁴⁹ And as noted earlier, the CEO of one of MCI’s other suitors, MFS/WorldCom, is certain that “[n]ot AT&T, not MFS or anyone else, is going to build local telephone facilities to residential customers. Nobody ever will, in my opinion.”²⁵⁰ Not long after the FCC issued its Local Interconnection Order, MFS set out to “re-orient[] its network build-out focus away from building to end-users and instead . . . connect[] to the customer via incumbent local exchange carrier unbundled loops.”²⁵¹

Interconnection regulation has thus accelerated new entry of brand names and marketing organizations. It has lowered entry barriers, but at a price to competition itself. The whole point

²⁴⁶See *Immediate Hill Backlash, FCC Considers Linking ESP Access Charges to ONA*, Communications Daily, Nov. 17, 1988, at 1 (“[A] cyclone of protest from Congress, NTIA and hundreds of computer-service users” killed the FCC’s initiative.). In its Access Charge Reform Order, the FCC succeeded only in raising monthly fees on second residential phone lines, the lines most often used for data access. See *Access Charge Reform Order* at ¶¶ 78, 344.

²⁴⁷Robert E. Allen, *Cutting the Barbed Wire: Lessons of a Reformed Monopolist*, delivered at the University of Texas, Austin, Texas, Oct. 21, 1996. See also AT&T Press Release, *AT&T Response To WorldCom Announcement*, Oct. 1, 1997 (“AT&T’s strategy” is to use “every possible option to enter local markets without laying out undue amounts of capital.”).

²⁴⁸Sprint Press Release, *Statement of William T. Esrey, Chairman and CEO of Sprint*, July 14, 1997.

²⁴⁹*London on the Line*, Washington Post, Nov. 10, 1996, at H1.

²⁵⁰M. Mills, *Hanging Up on Competition?*, Washington Post, June 1, 1997, at H1 (quoting Bernard Ebbers, Chairman and CEO of WorldCom).

²⁵¹D. Reingold, et al., *Merrill Lynch Capital Markets, Co. Rpt. No. 2515985, MFS Communications*, at 2 (Nov. 7, 1996).

of interconnection regulation is to allow competitive entry with less new building, less new capital investment, than would be necessary otherwise. No economically rational new entrant will build anything that it can buy from others more cheaply, least of all when it can buy from others below cost. Facilities-based competition by new entrants, and new investment by incumbents, will occur only when interconnection prices are properly aligned with underlying costs.

Impediments to Investment by Incumbent Local Phone Companies in High Speed Local Networks. All of this might not matter much if at least the incumbent local phone companies still had strong incentives to upgrade their networks. But regulation has sharply undermined those incentives, too.

Consider again the basic economics of providing residential phone service over existing analog copper plant. The basic loop and dial tone are provided at a price well below cost, but on average, the local phone company makes up the difference on local toll, access charges, and vertical services. See Figure 9, Section 2. But what happens under the new regulatory regime when that line is upgraded (or replaced) to support much higher bandwidth digital services?

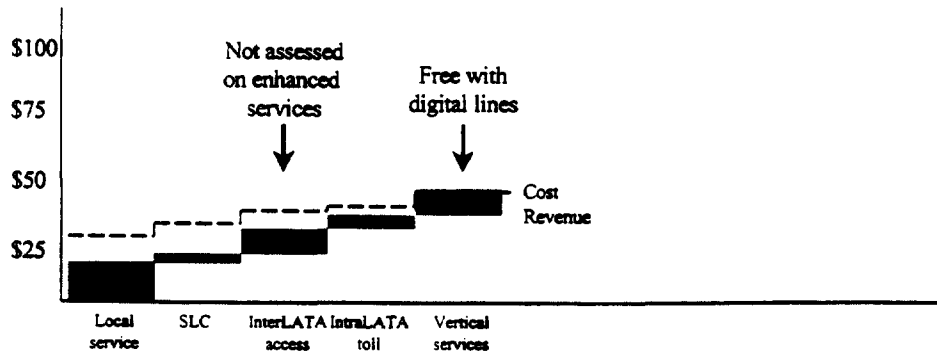
Many of the traditional sources of profit are immediately put in jeopardy. Even if used for fax or Internet telephony, the new digital lines will overwhelmingly be categorized as part of the universe of "enhanced services" – not "long distance" – from which local phone companies do not currently collect long-distance access charges.²⁵² Because it provides high-bandwidth service, one new line may displace two or more old ones. But multi-line service is generally profitable for local phone companies, because providing the first line costs so much more than providing the second. As a matter of course, phone companies run wires that contain four or six pairs of phone lines; the marginal cost of including the additional lines in the wire is very low.²⁵³

²⁵²*Access Charge Reform Order* at ¶ 341. The FCC has reserved judgment on the application of SLCs to non-ISDN high-bandwidth technologies that, like ISDN, create more than one communications channel per wire. ADSL, for example, contains three major channels: a high-speed (6 Mbps) downstream channel, a medium-speed (640 kbps) upstream channel, and a voice channel. But the upstream and downstream channels can each be divided into as many slower channels as the user wants. ADSL Forum, ADSL Tutorial: Twisted Pair Access to the Information Superhighway, http://www.adsl.com/adsl_tutorial.html. Judging from the FCC's treatment of ISDN, ADSL lines will likely be assessed a unique SLC adjusted to reflect any additional costs to the LEC. See *Access Charge Reform Order* at ¶¶ 116, 126.

²⁵³Since the 1970s, telephone companies have routinely equipped homes with two copper pairs, and there are now about 1.3 telephone lines in place per customer. A. Lindstrom, *Pulling Bandwidth Out of a Copper Hat*, *America's Network*, July 15, 1997, at 59. The cost of providing a second line for these homes, then, is only the labor cost of connecting the unused pair at both the user end and the switching end, and the cost of the switch port itself. This is significantly cheaper than laying a second wire. See N.J. Muller, *Strategic Information Resources*, *What Can We Expect From Telcos in the Post-Regulatory Telecommunications Age?*, <http://www.ddx.com/postregu.shtml> (telcos use "idle capacity in an existing plant" to bring second line costs down).

High-bandwidth digital lines may readily support (with the help of CPE and the Internet) highly profitable vertical services already provided over analog lines, such as Caller ID, call forwarding, and voice mail.²⁵⁴ Figure 28.

Figure 28. Revenue at Risk from Digital Lines



None of this would matter if local phone companies could continue charging traditional rates for service over upgraded lines. But they can't. As noted, access charges may be lost entirely when digital lines are linked to providers that call their business "enhanced service" rather than "long distance" – whether or not the service actually provides long-distance voice telephony, fax, and so forth. Beyond that, the general formula for competition in the Telecom Act will force incumbent telephone companies to unbundle (and offer at incremental cost-based prices, as discussed below) the equipment used to provide digital lines – including the copper loops themselves, of course – and to offer the complete service for resale, at sharp discounts to all comers.

In the past, even as residential prices were maintained well below cost, the quality of service was steadily upgraded system-wide. Since the Bell divestiture, for example, over 90

²⁵⁴Indeed, in Europe, "ISDN . . . has driven the digitalisation of networks and additional services offerings (such as Caller ID) of the carriers." N. Berezak-Lazarus and F. Arnold, *Internet Breathes Life Into xDSL*, Communications International, Dec. 1996, at 63. ISDN, for example, includes Caller ID signaling information with every incoming call; the right CPE can easily display Caller ID, with no revenue going to the telephone company. See S. Warren, *Building a WAN With ISDN BRI Routers*, Teleconnect, June 1997, at S30. New ISDN routers, like the \$500 YoYo Professional, use ISDN signaling information to provide Caller ID, call transferring, conference calling, and paging. *Remote Access*, Data Communications, July 1997, at 112. ISDN user forums and standards bodies are developing ISDN protocols to offer six-way conferencing, call forwarding, and voice mail. J.W. Ellis IV, *Hot, But For How Long?*, Telephony, Aug. 4, 1997. ADSL and other, higher bandwidth technologies will be more efficient ways of offering vertical features than analog lines. See C.H. Ferguson, *The Internet, Economic Growth, and Telecommunications Policy*, <http://www-eecs.mit.edu/people/ferguson/telecom/index.html>, Apr. 14, 1997.

sector deployment of advanced telecommunications and information technologies”²⁶¹ – includes provisions that give regulators the flexibility they need to learn from the Connecticut experience. Section 230(b) articulates a national policy “to promote the continued development of the Internet and other interactive computer services and other interactive media; [and] to preserve the vibrant and competitive free market that presently exists for the Internet and other interactive computer services, unfettered by Federal or State regulation.”²⁶² Section 706 expressly authorizes both the FCC and state regulators to “encourage the deployment . . . of advanced telecommunications capability” through “price cap regulation, regulatory forbearance, measures that promote competition in the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment.”²⁶³ The clause was “intended to ensure that one of the primary objectives of the bill – to accelerate deployment of advanced telecommunications capability – is achieved.”²⁶⁴

This is not the first time Congress has directed the FCC to create a more favorable, more deregulatory environment for new technology. Section 157 of the Communications Act, enacted in 1983, was precipitated by crippling FCC delays in approving the new technologies of that era, most notably cellular.²⁶⁵ Section 157 specifically aimed to “foster the delivery of new services and new technologies to the public in order to increase competition and promote diversity.”²⁶⁶ Well over a decade ago, Section 157 made it “the policy of the United States to encourage the provision of new technologies and services to the public,” and directed the Commission to determine within a year “whether any new technology or service proposed in a petition is in the

²⁶¹ *Conference Report* at 1; see also S. 652, §4 (“to promote and encourage advanced telecommunications networks, capable of enabling users to originate and receive affordable, high-quality voice, data, image, graphic and video telecommunications services”).

²⁶² 47 U.S.C. §230(b).

²⁶³ §706(c)(1) defines “advanced telecommunications capability” as “high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.”

²⁶⁴ Telecommunications Competition and Deregulation Act of 1995, Report of the Committee on Commerce, Science, and Transportation on S. 652, 104th Cong., 1st Sess., S. Rpt. Session 104-23, Mar. 30, 1995.

²⁶⁵ “Recent Commission decisions have authorized a number of new common carrier services. However, applications to provide these service have created an enormous backlog.” Federal Communications Commission Authorization Act of 1983, P.L. 98-214, 1983 U.S.C.A.N. 2219, 2220.

²⁶⁶ *Ibid.*

public interest.²⁶⁷ At least 20 other sections in the Communications Act are explicitly concerned with speeding up deployment of new technology.²⁶⁸

In sum, regulators have in hand all the authority they need to unleash local competition and spur rapid new investment in high-bandwidth infrastructure. It is time to use it.

²⁶⁷47 U.S.C. § 157.

²⁶⁸See 47 U.S.C. §§ 254(b)(2), (3), (6), (c)(1), (h)(2)(A), 225(d)(2), 230(b)(1) and (2), 257(b), 273(e)(3), 309(j)(3)(A), (B), (C), (j)(6)(G), (j)(12)(D)(ii), (j)(13)(D), 628(a), 710(b)(3), 710(e), 714(a)(2).

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